

Dieters May Lose Bone Density

Women who consistently limit what they eat to avoid gaining weight may undermine the health of their bones, according to a new study by ARS researchers in California. The study looked at the eating behavior of 192 women volunteers between the ages of 18 and 50.

Those classified as restrained eaters had significantly lower bone mineral density and bone mineral content than women who said they weren't concerned about what they ate. These two bone mineral measurements are key indicators of overall bone strength and health, according to physiologist Marta D. Van Loan and chemist Nancy L. Keim of the ARS Western Human Nutrition Research Center in San Francisco.

The study "provides new evidence that women who habitually worry about what they eat—to meet a target weight that they've imposed upon themselves or that they think our image-conscious society demands—may increase their chances of developing osteoporosis," says Van Loan.

A thinning and weakening of bone, osteoporosis increases the risk of fractures, particularly of the hip and spine. Spinal fractures are painful and may result in debilitating curvature of the spine.

Van Loan and Keim used a DEXA device—a dual energy x-ray absorptiometer—to measure bone mineral content and density. They administered a standard test known as a Three-Factor Eating Inventory to determine if volunteers were always overly concerned about what they ate, as is typical of restrained eaters.

"As far as we know," Van Loan says, "our study is one of the first of its kind to demonstrate a significant association between restricted food intake and either bone mineral content or bone mineral density."

"Exercise and eating a well-balanced diet with adequate calcium," says Van Loan, "are two of the best ways to keep your bones strong and healthy. Foods that are a good source of calcium include cheese, milk, ice cream, baked beans and other dried legumes, dried figs, broccoli, most dark-green leafy vegetables, and soft fish bones like those in canned salmon."

"Exercise that increases the force or load on your skeleton, such as jogging, lifting weights, or working out with resistance-type gym equipment," notes researcher Keim, "also helps keep bones from becoming brittle and porous."—By **Marcia Wood**, ARS.

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Beneficial Wasps Get ID Tags

Old World parasites stayed behind when the silverleaf whitefly stole into the United States in 1986 and began an unimpeded feeding frenzy on vegetable, cotton, and horticultural crops. The pest still costs U.S. growers more than \$500 million annually.

To counter the whitefly and related pests, scientists with the Agricultural Research Service and other agencies have collected parasitic wasps from the pests' native habitats. In quarantine laboratories, researchers with USDA's Animal and Plant Health Inspection Service (APHIS) are evaluating many of the collected species and strains for their suitability as biological control agents.

Already, a few of these tiny wasps, which are barely visible lookalikes, have been released in U.S. environments. "Now," asks geneticist Larry J. Heilmann, formerly with ARS, "how will one tell the released strains apart to determine how well each reproduces and disperses under various field conditions?"

The answer: by their unique genetic material, or DNA.

In his research at the ARS Insect Genetics and Biochemistry Research Unit in Fargo, North Dakota, Heilmann found an oft-repeated genetic sequence of 33 base pairs in the DNA of the wasp *Encarsia formosa* collected in Egypt. From these base pairs, he developed a DNA probe—a sequence that binds only to a unique portion of DNA; in this case, to DNA specific to *E. formosa* strains from the eastern Mediterranean region.

The test Heilmann developed to ascertain a wasp's eastern Mediterranean origin involves simply squashing the wasp on filter paper, immersing the paper in a radioactive DNA probe solution, rinsing, and then testing for any significant residual telltale radioactivity. For field tests, he says, it may be possible to replace the radioactive probes with fluorescent ones.

Such tests will distinguish wasps easily and quickly and less expensively than a laboratory-based polymerase chain reaction assay that APHIS now uses.

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The silverleaf whitefly, *Bemisia argentifolii*, measures just one-sixteenth-inch in length.

With the prototype research done, many DNA probes should soon become available for identifying exotic and native North American *Encarsia* and other wasps. So far, one additional probe identifies strains of *Eretmocerus* wasps native to the eastern hemisphere. Another more specifically pinpoints strains from Pakistan and the United Arab Emirates.—By

Ben Hardin, ARS.

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